IDEA Drive

Hardware Manual



www.haydonkerk.com

4-2013

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Revision History

Date	Description
September 2011	Initial version
January 2012	Added digital input wiring examples
March 2013	Manuals combined Wiring examples revised

Introduction

This manual is intended to provide basic hardware specifications for the Haydon Kerk IDEA drive. Several styles of the IDEA drive are available. For detailed information on use and programming of the drive, please refer to the IDEA Drive User's Manual, available at idea-drive.com.

ACM4806E / PCM4806E IDEA Drive

Specifications

Attribute	Value
Drive Input Voltage Range	12-48Vdc
Maximum Drive Current (per phase)	0.6Arms (Plus optional 30% boost during ramping)
Step Modes	Full, Half, ¼, 1/8, 1/16, 1/32, 1/64
Communications	USB (Mini B connector) RS-485
Digital I/O Voltage Range	5-24Vdc
Digital Inputs	4
Digital Sinking Outputs	4
Digital Output Maximum Sinking Current	200mA (each)
Digital Input Maximum Current	8mA (each)
Maximum Temperature	70ºC (Measured at heat sink)
Program Storage Size-Type	85 Kbytes-Flash
Maximum Number of Stored Programs	85, Referenced by 10 character program names
Position counter range	64bit
Type of Ramping	Trapezoidal
Interrupt sources	4 inputs (rising, falling or both edges), internal position counter (when reaching a programmed position).

ACM4806E IDEA Drive Engineering Drawings

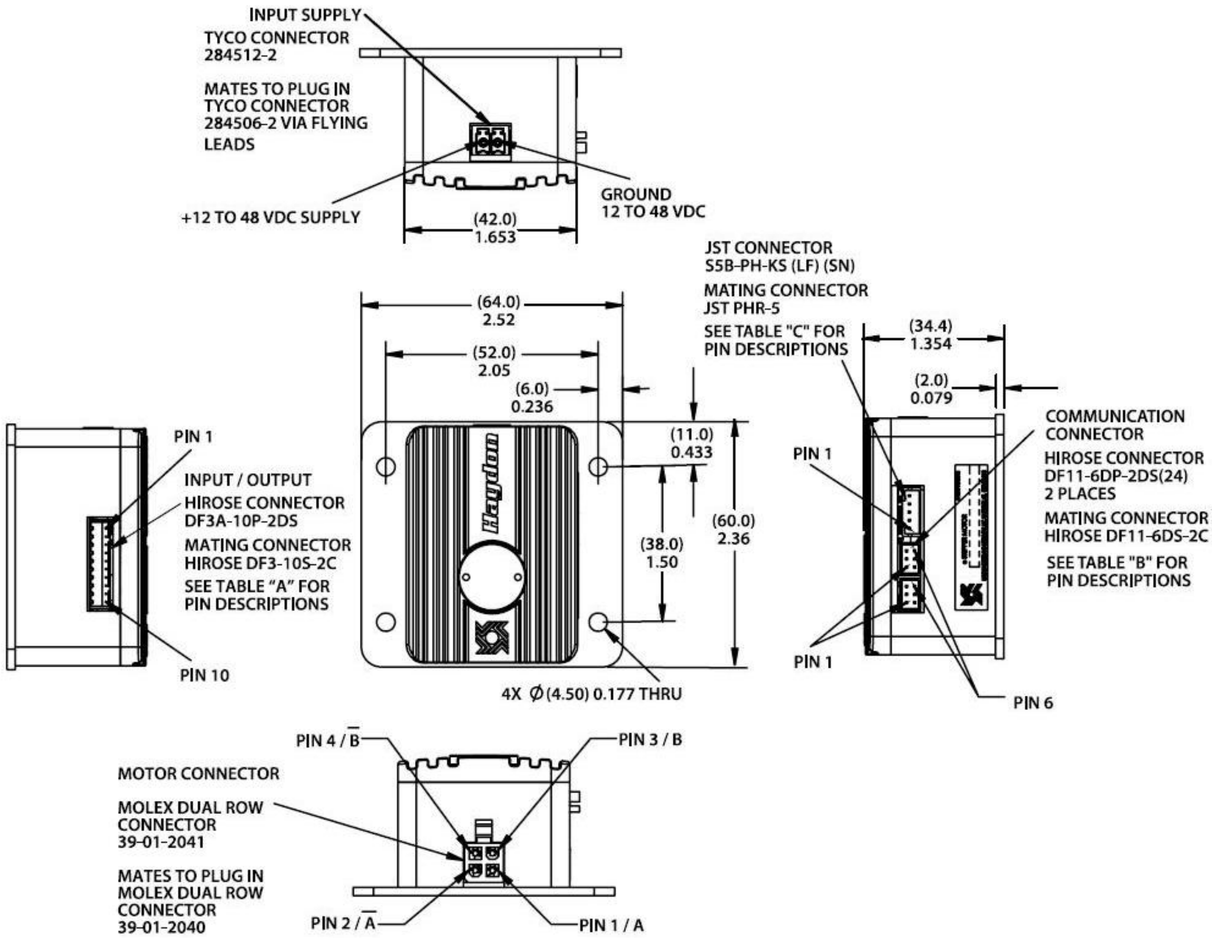


TABLE "A"

PIN POSITION	DESCRIPTION	NOTES
PIN 1	GROUND I/O SUPPLY	5 TO 24 VDC
PIN 2	+ I/O SUPPLY	5 TO 24 VDC
PIN 3	INPUT 1	
PIN 4	INPUT 2	
PIN 5	INPUT 3	
PIN 6	INPUT 4	
PIN 7	OUTPUT 1	
PIN 8	OUTPUT 2	
PIN 9	OUTPUT 3	
PIN 10	OUTPUT 4	

TABLE "B"

PIN #	DESCRIPTION
1	Y / NON-INVERTING DRIVER OUTPUT
2	Z / INVERTING DRIVER OUTPUT
3	GROUND
4	GROUND
5	A / NON-INVERTING RECEIVER INPUT
6	B / INVERTING RECEIVER INPUT

TABLE "C"

PIN #	DESCRIPTION
1	+5 V
2	GROUND
3	INDEX / NO CONNECTION
4	"B" CHANNEL
5	"A" CHANNEL

PCM4806E IDEA Drive Engineering Drawings

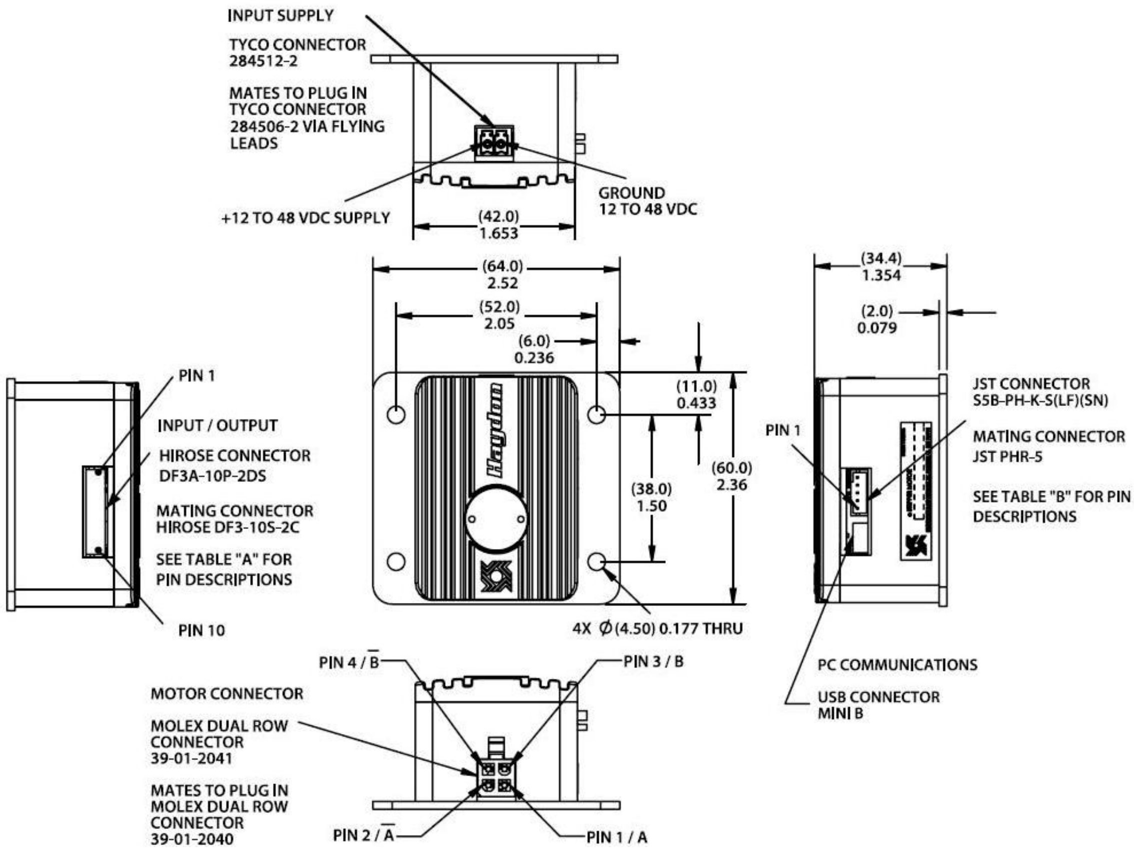


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TABLE "B"

PIN #	DESCRIPTION
1	+5V
2	GROUND
3	INDEX / NO CONNECTION
4	“B” CHANNEL
5	“A” CHANNEL

ACM4826E / PCM4826E IDEA Drive

Specifications

Attribute	Value
Drive Input Voltage Range	12-48Vdc
Maximum Drive Current (per phase)	2.6Arms (Plus optional 30% boost during ramping)
Step Modes	Full, Half, ¼, 1/8, 1/16, 1/32, 1/64
Communications	USB (Mini B connector) RS485
Digital I/O Voltage Range	5-24Vdc
Digital Inputs	4
Digital Sinking Outputs	4
Digital Output Maximum Sinking Current	200mA (each)
Digital Input Maximum Current	8mA (each)
Maximum Temperature	70ºC (Measured at heat sink)
Program Storage Size-Type	85 Kbytes-Flash
Maximum Number of Stored Programs	85, Referenced by 10 character program names
Position counter range	64bit
Type of Ramping	Trapezoidal
Interrupt sources	4 inputs (rising, falling or both edges), internal position counter (when reaching a programmed position).

ACM4826E IDEA Drive Engineering Drawings

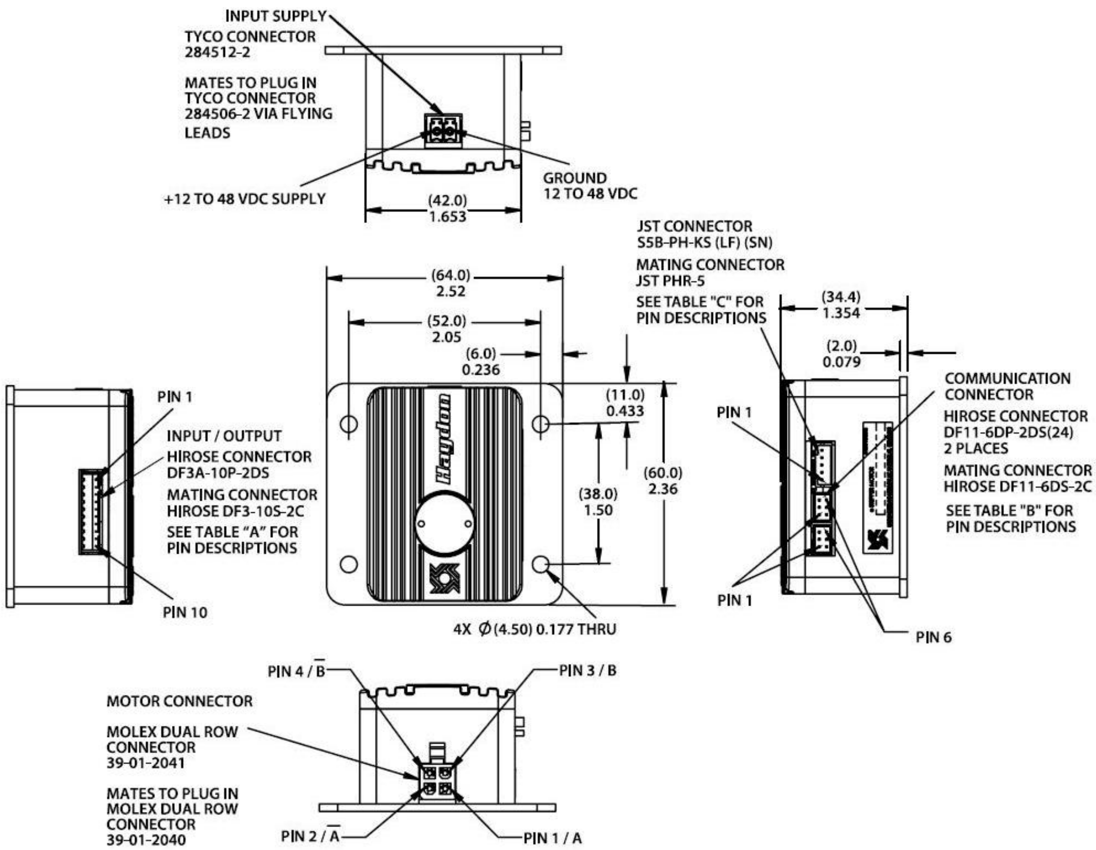


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TABLE "C"

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PCM4826E IDEA Drive Engineering Drawings

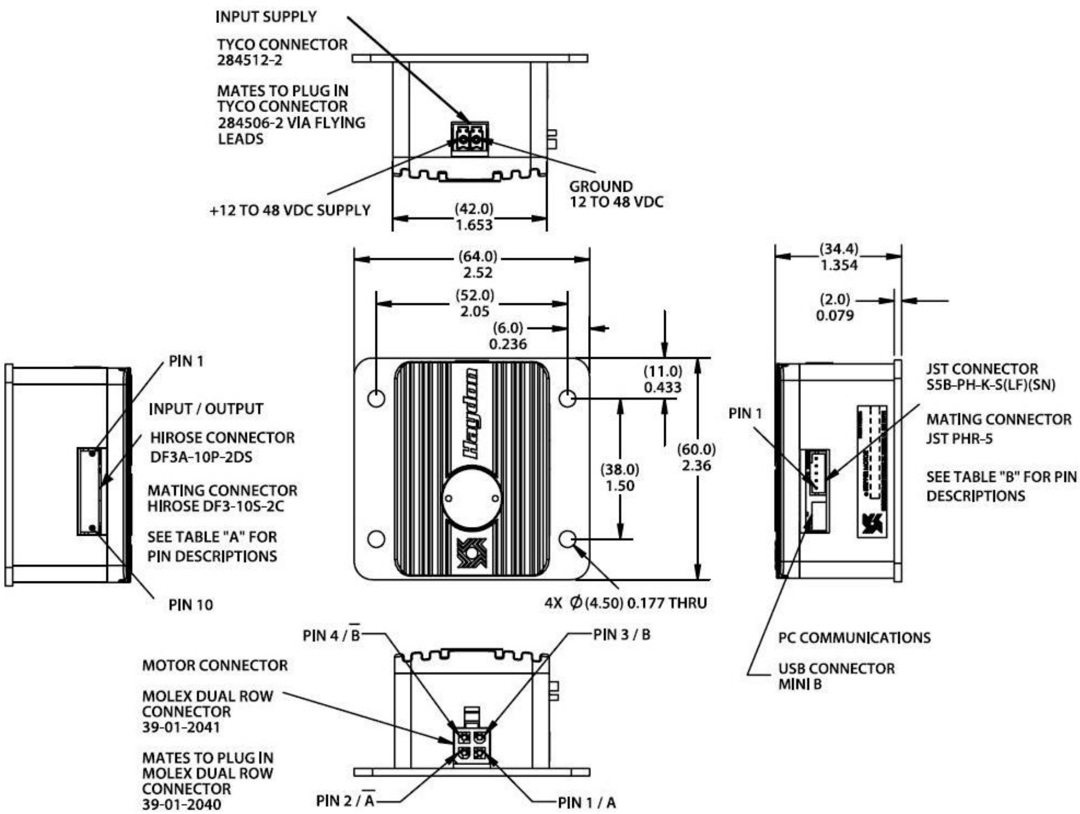


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TABLE "B"

PIN #	DESCRIPTION
1	+5V
2	GROUND
3	INDEX / NO CONNECTION
4	"B" CHANNEL
5	"A" CHANNEL

ACM7539E / PCM7539E IDEA Drive

Specifications

Attribute	Value
Drive Input Voltage Range	12Vdc up to the lesser of: 8 times the motor voltage or 75Vdc.
Maximum Drive Current (per phase)	3.85Arms (Plus optional 30% boost during ramping)
Step Modes	Full, Half, ¼, 1/8, 1/16, 1/32, 1/64
Communications	USB (Mini B connector) RS-485
Digital I/O Voltage Range	5-24Vdc
Digital Inputs	4
Digital Sinking Outputs	4
Digital Output Maximum Sinking Current	200mA (each)
Digital Input Maximum Current	8mA (each)
Maximum Temperature	70ºC (Measured at heat sink)
Program Storage Size-Type	75 Kbytes-Flash
Maximum Number of Stored Programs	75, Referenced by 10 character program names
Position counter range	64bit
Type of Ramping	Trapezoidal
Interrupt sources	4 inputs (rising, falling or both edges), internal position counter (when reaching a programmed position).

ACM7539E IDEA Drive Engineering Drawings

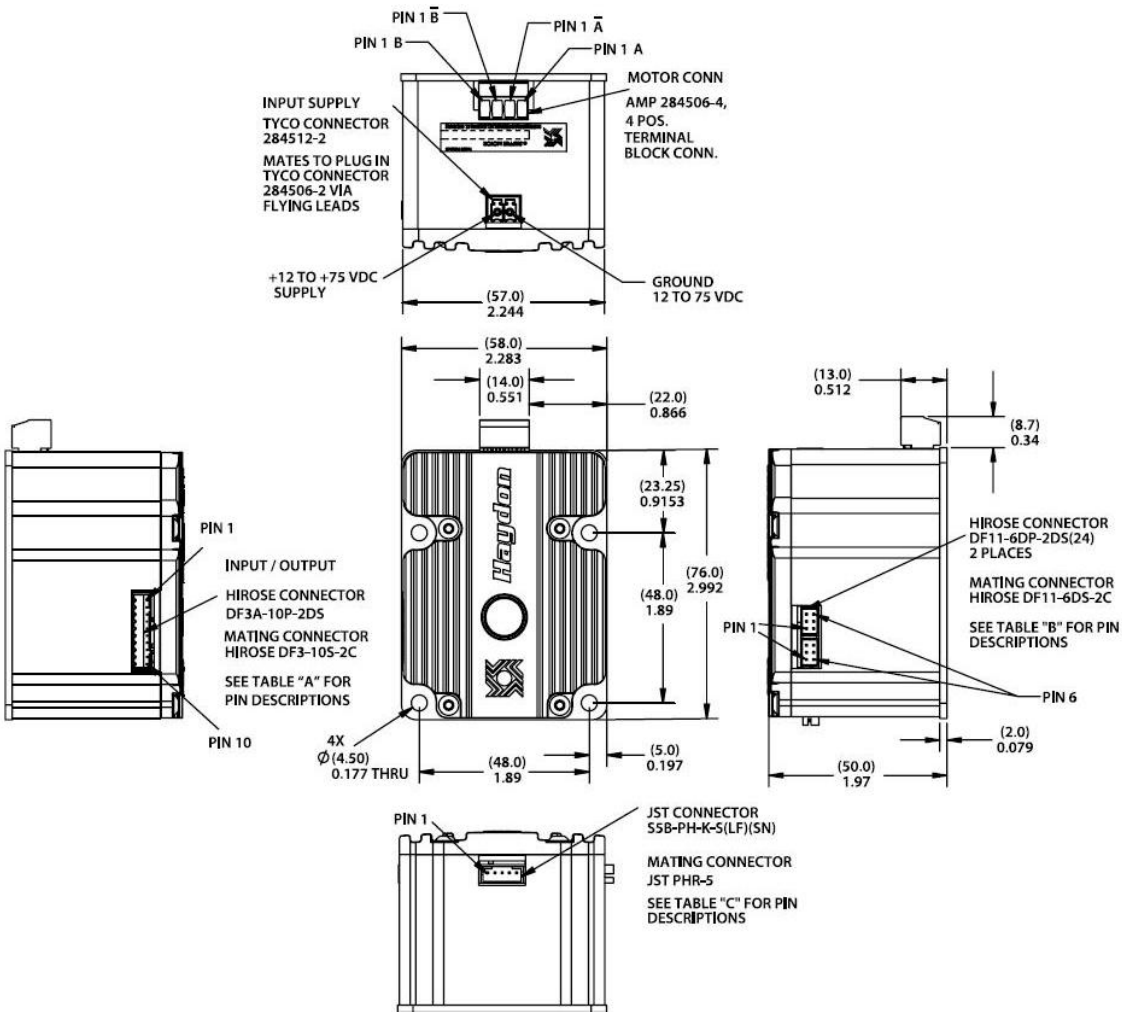


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TABLE "C"

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PCM7539E IDEA Drive Engineering Drawings

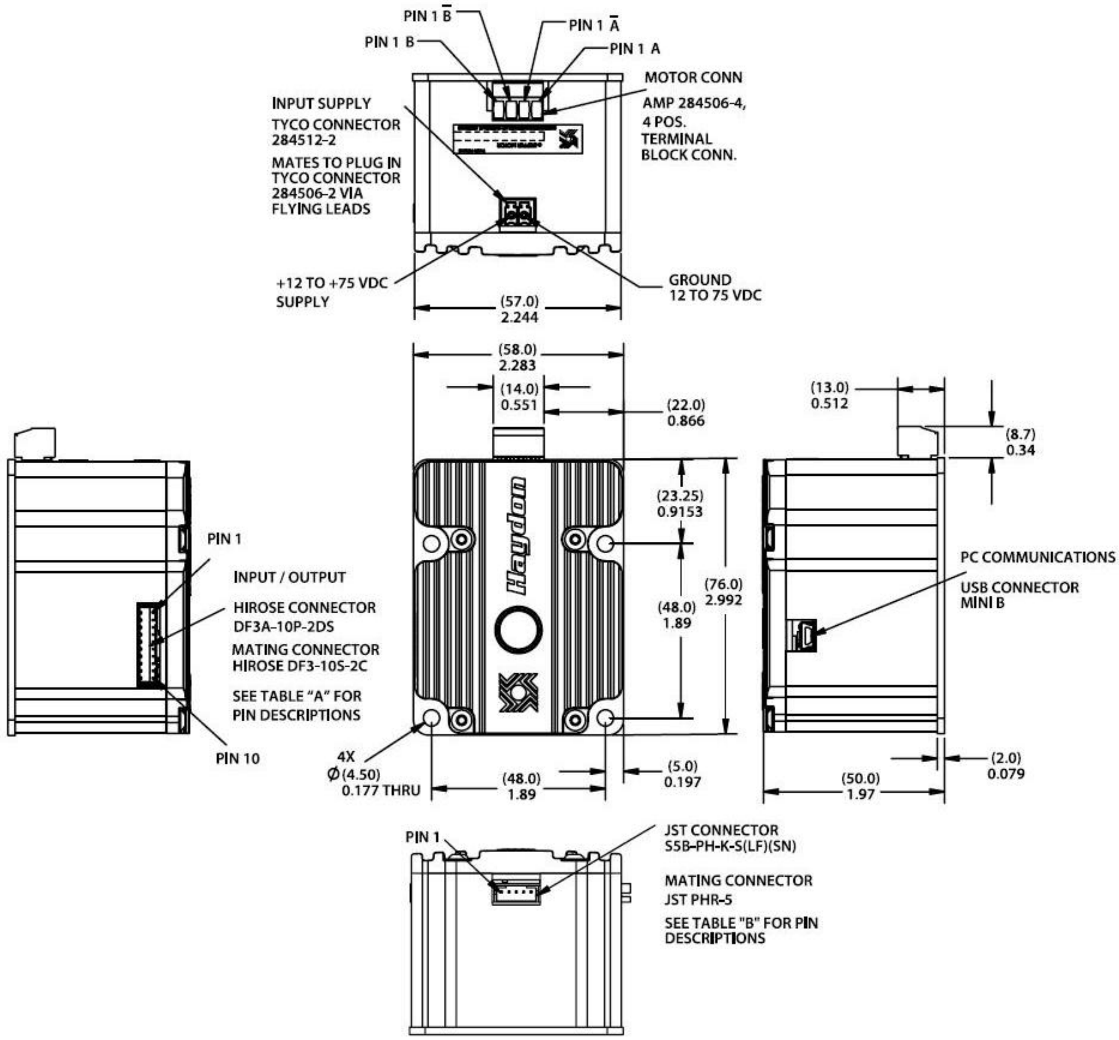


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PIN 8	OUTPUT 2	
PIN 9	OUTPUT 3	
PIN 10	OUTPUT 4	

TABLE "B"

PIN #	DESCRIPTION
1	+5V
2	GROUND
3	INDEX / NO CONNECTION
4	"B" CHANNEL
5	"A" CHANNEL

Connections

Basic Wiring: To connect power to the drive and control it with the IDEA Drive User Interface you will need the following:

- A power supply, minimum of 12VDC.
- A PC
- Power cable (available from Haydon Kerk p/n 56-1348)
- Haydon motor terminated with Molex connector 39-01-2040 (4806 & 4826 drives only)
    - 7539 drive has screw terminals for a motor connection
- 10 wire I/O cable (available from Haydon Kerk p/n 56-1352). Note: this cable is only required if the drive is interacting with an external device.

PCM (USB version)

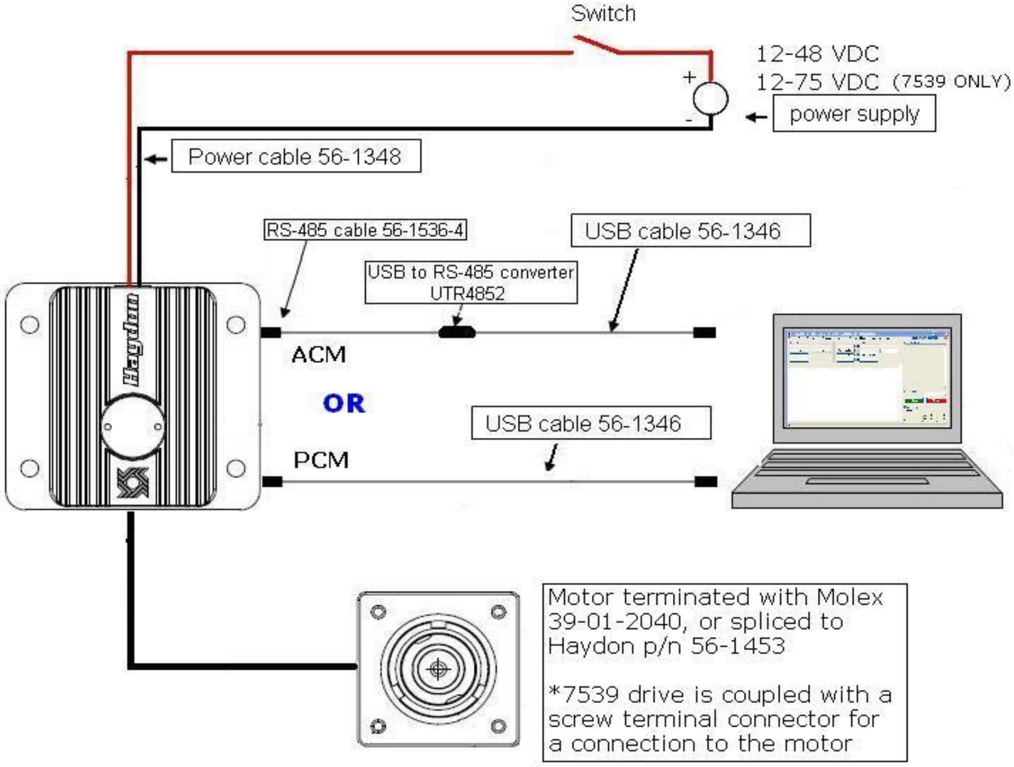
- USB to Mini B USB cable (available from Haydon Kerk p/n 56-1346)

ACM (RS-485 version)

- USB to Mini B USB cable (available from Haydon Kerk p/n 56-1346)
- RS-485 cable (available from Haydon Kerk p/n 56-1536-4)
- USB to RS-485 converter (available from Haydon Kerk p/n UTR4852)

The following page contains the proper wiring diagram for the IDEA drive, power supply and PC. The I/O and encoder cables are omitted.

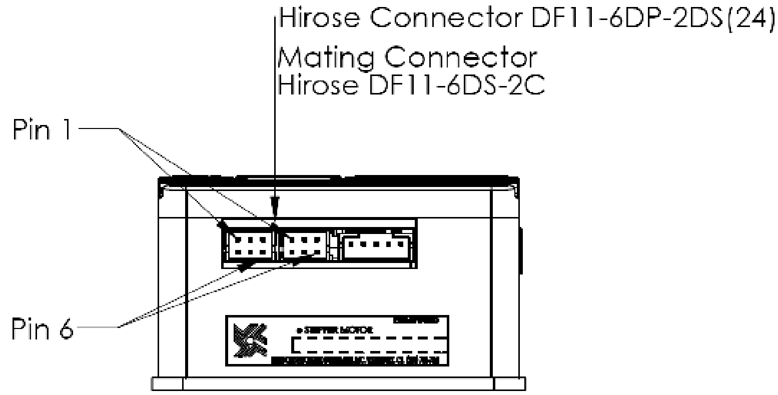
Basic Wiring Diagram



Accessories

Accessories	Part No.
USB Cable (A to Mini B), 2 meters	56-1346
Power Cable, 1 meter	56-1348
I/O Cable, 1 meter	56-1352
RS-485 Cable, 1 meter	56-1536-4
Software Installation Disk	55-010
Motor Connector Assembly	56-1453
USB to RS-485 Adapter	UTR4852
Encoder Cable with flying leads, 1 foot	56-1715
Encoder Harness to E4 encoder, 1 meter	56-1639-4
Encoder harness to E5/E6 encoder, 1 meter	56-1621-4

RS-485 Pin Descriptions



PIN #	DESCRIPTION
1	Y / NON-INVERTING DRIVER OUTPUT
2	Z / INVERTING DRIVER OUTPUT
3	GROUND
4	GROUND
5	A / NON-INVERTING RECEIVER INPUT
6	B / INVERTING RECEIVER INPUT

RS-485 pins are often referred to by their read/write functionality

Y = Rx+

Z = Rx-

A = Tx+

B = Tx-

Encoder Inputs

The IDEA drive is equipped with inputs for a single-ended, Quadrature encoder attached to the motor it drives. Quadrature encoders have 2 output signals, A and B, which are nominally 90 electrical degrees out of phase. On each rising or falling edge, the relative logic levels of the two phases can be used to determine the direction of rotation. The decoder within the drive interprets A leading B as motion in the clockwise direction, as viewed from the front face of the motor. This means that if a rising edge is detected on phase A, and phase B is at a logical high, then the motor just rotated counter-clockwise.

The IDEA drive watches for and rising and falling transitions on phase A, and increments or decrements the position counter accordingly. Using this method, a 1000 line optical rotary encoder would have 2000 counts per revolution, and a change in position would be detected every 0.18º.

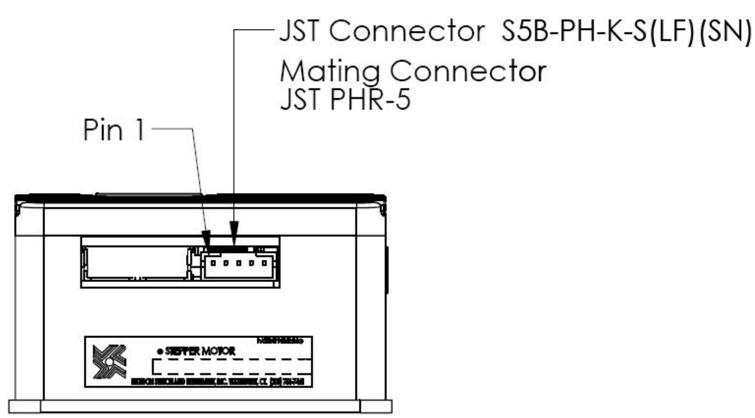
The IDEA drive line of products can be configured to use the encoder feedback in a number of ways. For further detail on the encoder functions available, please see the IDEA Drive user’s manual, available at idea-drive.com.

Encoder Wiring

The encoder connector can be wired to any 2 channel quadrature encoder that operates between 3.3Vdc and 5Vdc**.** For encoders that work on 5VDC, power to the encoder can be supplied through pin 1 of the encoder connector, otherwise a separate 3.3Vdc power supply is required. Whether or not power is being supplied by the drive, pin 2 must be connected to the same ground as the encoder. This is internally connected to the IDEA drive’s ground connection.

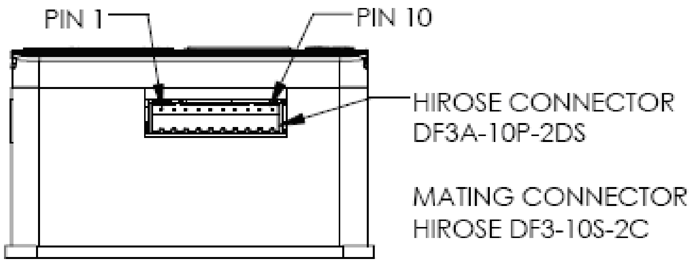
Pin 3 is for encoders with an index signal. This may be left unconnected, and is for future revisions which may make use of the index signal.

Pins 4 and 5 are the B and A connections, respectively. When the output shaft of the motor is rotating clockwise as viewed from the front of the motor phase A should lead phase B. Check your encoder’s documentation to check if A and B need to be swapped.



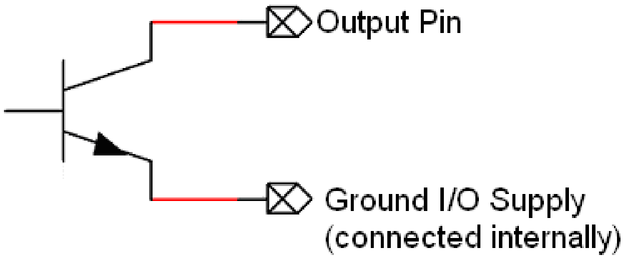
Pin #	Description
1	+5Vdc
2	Ground
3	Index
4	B
5	A

Digital I/O Pin Descriptions

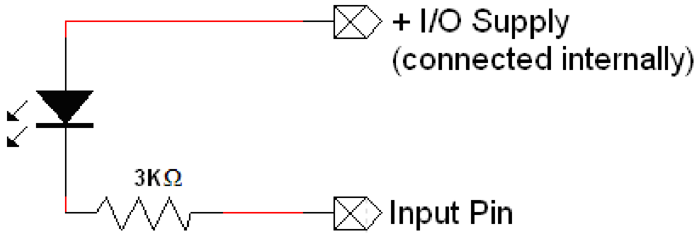


PIN POSITION	DESCRIPTION	NOTES
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PIN 2	+ I/O SUPPLY	5 TO 24 VDC
PIN 3	INPUT 1	
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Open Collector Output Pin Description



Input Pin Description



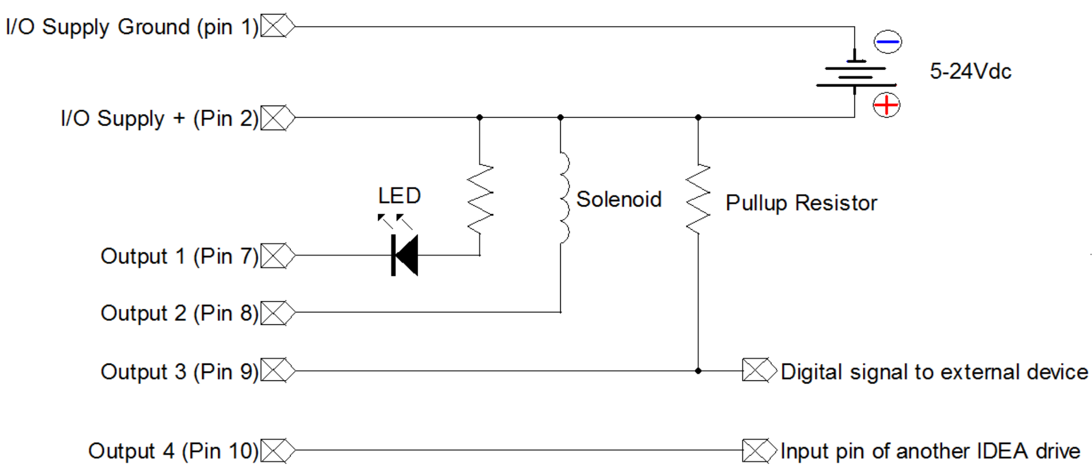
Digital I/O Wiring

The IDEA drive has four optically isolated inputs and four optically isolated open-collector outputs. A power supply is necessary to activate the opto-isolators with a voltage range of 5-24VDC. As the outputs are open-collector, they will need a pull-up resistor tied to the + I/O supply if a high level voltage is required. The outputs are capable of sinking up to 200mA each.

Note: The inputs can be used in two ways. They can be connected to logic levels that swing between I/O supply ground and + I/O supply, or they can be attached to a switch connected to I/O supply ground. In the second configuration, when the switch is open, the drive will see this as a logic high, when the switch is closed, and the input is connected to I/O supply ground, the drive will see this as a logic low.

Note: When an input is connected to a mechanical switch or relay, a phenomenon called “bounce” can occur. When the switch contact is almost closed, several electrical arcs can form. If an input is being used as an interrupt, each arc will be seen as a rising and falling edge, causing several false interrupts to trigger. Any input being used as an interrupt source should only be attached to solid state devices or a switch with debounce circuitry.

Digital Output Wiring Examples



Digital Input Wiring Examples

